Net Environmental Benefit Analysis for LA Orphan Anchors

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Purpose:
The purpose of this report is to provide the Federal On-Scene Coordinator (FOSC) with a Net Environmental Benefit Analysis (NEBA) associated with removing orphan anchors from the waters of the state of LA which were deployed during the response to the Deepwater Horizon MC252 Spill of National Significance. The question for this NEBA is which response option provides for the greatest net environmental benefit when considering that recovery operations will have some adverse environmental impacts. It is noted that the State of Louisiana stated their expectation that the anchors used during the response be removed.

Geographic area of concern:
The areas of concern in general for this analysis include selected tidal waters in Louisiana where oil boom was placed during the oil spill response, and specifically those waters of St. Bernard, Jefferson, Terrebonne, Lafourche and Plaquemines Parishes. The specific inland bays, passes, and waterways were selected due to their shallow water and higher vessel traffic volume which presented the highest risk for hazards to navigation, and are identified in the Orphan Anchor Phase II Program Report to the Federal On Scene Coordinator. The Mississippi River delta plain with its associated wetlands and barrier shorelines are characterized as the product of the continuous accumulation of sediments deposited by the river and its distributaries. Regular shifts in the river's course have resulted in four ancestral and two active delta lobes, which accumulated as overlapping, stacked sequences of unconsolidated sands and mud. As each delta lobe was abandoned by the river, its main source of sediment, the deltas experienced erosion and degradation due to compaction of loose sediment, rise in relative sea level, and catastrophic storms. Marine coastal processes eroded and reworked the seaward margins of the deltas forming sandy headlands and barrier beaches. As erosion and degradation continued, segmented low-relief barrier islands formed and eventually were separated from the mainland by shallow bays and lagoons. The Louisiana coastal region is transited by recreational and commercial vessels including shrimp boats, fishing vessels, duck hunters, and more.

Anchor Characterization:
Much background work on characterizing the anchor issues and with identifying possible anchor locations has been completed under two previous studies developed for the FOSC. The following characterization and ecological and human health risk information is provided from the NEBA for Boom Anchor Removal dated March 18, 2011. The potential risks posed by leaving the anchors in place are the ecological and human health risks associated with the slow rust and decay of the anchors and the physical risk of hazard to navigation as well as commercial fishing and recreational activities. Most of the anchors used are standard galvanized Danforth anchors composed of zinc galvanized mild steel (which consists of iron and carbon).



Photos of Danforth anchors. Shank rises maximum of thirty degrees from horizontal when deployed. This encourages the flukes to dig in and hold rather than slide along the bottom. The anchors are designed to lay flat in storage or if free from chain or rode to avoid creating a hazard.

Ecological and Human health risk of zinc and iron

1. Zinc

   Zinc is naturally present in seawater and is considered an essential dietary mineral necessary for human health. Zinc is present in surface waters largely from naturally occurring deposits in the earth's crust but it is also present as a result of industrial wastewater discharges from galvanic industries, battery production etc. The average zinc concentration in seawater is 0.6 – 5 parts per billion. Rivers generally contain between 5 and 10 parts per billion. Algae contain as much as 20-700 parts per million, sea fish and shells contain 3-25 parts per million, oysters contain 100-900 parts per million and lobsters contain 7-50 parts per million. The World Health Organization states that there is no health based limit required for zinc in drinking water. However, there is an aesthetic limit for zinc in drinking water of 5 parts per million because of taste. Thus elemental zinc is generally not considered a hazard to human health or the environment. Ecotoxicological tests indicate that a predicted no effect concentration is 150 to 200 parts per billion. This is considered to be the concentration at which no environmental effects occur. The human body contains approximately 2-3 grams of zinc; and the mineral zinc has dietary value as a trace element. Its functions involve mainly enzymatic processes and DNA replication. The human hormone insulin contains zinc. The minimum daily intake is 2-3 milligrams, at which level it prevents deficiencies. The low toxicity of zinc to humans and aquatic life and the fact that it is an essential trace mineral for humans, all indicate the risks from exposure to the small amount of zinc that may be slowly released from rusting anchors in the nearshore environment are extremely low. At this stage of the NEBA, there are no significant ecological or human health risks from potential exposure to zinc resulting from leaving the anchors in place.

2. Iron:

   Iron is one of the most abundant metals on earth and is considered essential to most life forms including humans. Iron is generally considered not soluble in water, particularly seawater, because when iron contacts water the normal product is rust particles. However, in very low concentrations, iron may occur in freshwater in two forms: either the soluble ferrous iron or the insoluble ferric iron. Freshwater containing ferrous iron is clear because the iron is dissolved. When exposed to air or atmosphere (oxygen), the water turns cloudy and a reddish brown substance begins to form. This sediment is the oxidized (rust) or ferric form of iron that dissolves in water only at very low concentrations. Rivers contain 0.5 to 1 part per million of iron naturally. Oxygen in the water limits the concentration. Some groundwater with low oxygen levels may contain approximately 100

parts per million. Seawater contains 1 to 3 parts per billion iron naturally. The amount varies by area and depth because of available oxygen in seawater and because iron is an essential nutrient for life that is quickly taken up by plankton and other sea life when it is available. Most algae naturally contain between 20 and 200 parts per million iron and some brown algae may contain up to 4,000 parts per million. Iron is part of their life chemistry. Iron occurs naturally in many seafoods such as tuna, halibut, shrimp and oysters, and in terrestrial foods such as chicken, pork and beef. In humans, iron is a central component of hemoglobin in the blood. One pint of blood contains approximately 250 milligrams of iron which binds oxygen and transports it from the lungs to other body parts. It then transports CO2 back to the lungs. People with low iron levels in their blood are called anemic and they may be treated with iron supplements. Iron is considered a vitamin supplement for children under 6 years old and is vital to some brain and memory functions. Like all chemicals, iron can be toxic if ingested in extreme overdose or in some chemical forms not common in nature. Iron is not classified as a priority pollutant because of its low toxicity to sea life in water and sediments.

Species and Habitat Overview:

Endangered and threatened species or critical habitat under the jurisdiction of NMFS that may occur in or near the action area are sea turtles and Gulf sturgeon. Protected marine mammal species (dolphins and whales) may also occur in or near the action area. Vessel and in-water operations, including orphan anchor location and retrieval, may affect these animals either directly or indirectly through sound, physical contact, habitat alteration, and/or harassment. General habitat types occurring in the project areas include unvegetated and vegetated bottoms, oysters, and the water column. These habitat types have been identified and described as Essential Fish Habitat for federally managed species under the Magnuson-Stevens Fishery Conservation and Management Act. Unvegetated bottoms consist of sand, silt and mud and vegetated bottoms may support algae or rooted submerged aquatic vegetation such as *Ruppia* sp. and *Halodule* sp.

Response Options:

1. Natural processes - Leave known orphan anchors in place to degrade via natural processes.

2. Least Invasive Methods – Includes: Shallow water Dive team recovery, Orange peel grapple.

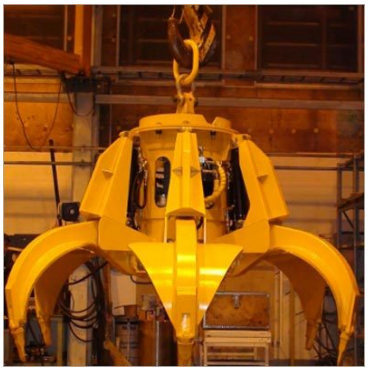
3. Most Invasive Methods – Includes: Water based dredge, Propeller wash deflector device, Cofferdam. All three methods are deemed to be essentially equivalent in terms of expected impact to the marine environment for the purpose of this analysis.

Response Descriptions:

1. Natural processes - Anchor degradation via natural process. No mechanical or manual recovery is performed.

2. Least Invasive Method Examples - Dive team recovery would utilize small boats and poles for finding anchors located in shallow water & sediments. Recovery of anchors in shallow waters once located would be via divers digging up the anchor when located no more than one foot (1') in depth within the substrate. Orange peel grapple, Orange Peel Grapple picture and specification shown below. Requires crane and the orange peel grapple. Crane to have a 50-ton lifting capacity minimum and be capable of reaching past the side of the barge a minimum of 40-ft with the Grapple. Crane shall be capable of working the

specified orange peel grapple in a maximum of 30-ft of water. Crane certification papers and load test information within the last 12-months to be furnished to BP. Orange Peel Grapple has a 0.75 yard capacity, is mechanical, and is operated with 2 wire ropes. Designed to allow mud and silt to escape while capturing orphaned anchors. Grapple to have an opening large enough to capture the anchor. Some modification may be required. This method is less invasive due to its ability to make a single grab or very limited number of grabs through the sediment to retrieve an anchor.



3. Most Invasive Method Example - Water based grab dredge. A grab dredger picks up seabed material with a clam shell grab, which hangs from an onboard crane or a crane ship, or is carried by a hydraulic arm, or is mounted like on a dragline. This technique is often used in excavation of bay mud. Most of these dredges are crane barges with spuds. This method is considered more invasive due to the repeated grabs that are required to remove the overlying sediments and expose the object for recovery. The creation of a large depression in the sediment is necessary to ensure the depression walls remain stable in order to facilitate anchor recover.

Analysis Issues:
To evaluate the options above, answers were sought for these questions:

a. Are there human health concerns in leaving the anchors in place?

b. If no further action is taken, what are the potential effects of the anchors to the environment?

c. Are there commercial or recreation vessel concerns?

d. Are there hazard to navigation concerns?

e. What does a Net Environmental Benefit Analysis (NEBA) justify?

Analysis Assumptions and Ranking Factors:
See appendix (c).

Analysis Results:
See matrix.
Based on this review, the following are the responses to the questions posed above:

a. Are there human health concerns in leaving the anchors in place?

   There are no expected human health concerns due to the chemical composition or degradation of the zinc galvanized mild steel Danforth anchors.

b. If no further action is taken, what are the potential effects of the anchors to the environment?

   If left in place the zinc galvanized mild steel Danforth anchors are expected to remain buried in the soft, muddy sediments and slowly oxidize. An anchor test conducted found that within ten days, the test anchors settled to a depth of 1.9 to 2.1 meters at the test site. The anchor test may not be representative of sediment conditions across the entire area of concern and, for example, anchors may have minimal penetration into sand sediments. The chemical composition and degradation of the metal anchors would be the primary concern, however the loading rate would be very small, and the area of impact would be small as well. The anchors are expected to present minimal environmental threat to the marine environment including wildlife due to the natural concentrations of zinc and iron present in the marine environment. Zinc based protection products are also widely used in marine applications and the addition of zinc to the environment from orphan anchors is considered insignificant compared to the loadings from other sources.

c. Are there commercial or recreation vessel concerns?

   The Orphan Anchor Survey verified anchors in St. Bernards are deeply buried in soft deltaic sediments. These anchors are unlikely to be re-exposed, dislodged and moved shoreward. Anchors are small, compact, heavy objects that have a small cross sectional area -- they are heavy for their size. If the same amount of steel as in an anchor were to be reformed into another shape, for example, into a barrel or box shape, it would weigh the same but have a much larger cross sectional area, which would make it subject to being moved by wave action if exposed on the seabed. Waves can move heavy objects with large cross-sectional area, for example a 55-gallon oil drum or a sunken boat hull; either could be dislodged and moved horizontally by wave action because they have a large cross section area exposed to wave energy. An anchor, because of its small cross sectional area, is much less likely to be dislodged and moved by wave action should it become uncovered during a storm. Because waves disturb the bottom by suspending sediment in the water column, an anchor is most likely to migrate further downward, vertically, in the sediments in which it is buried than be transported horizontally. For the anchor to become exposed, around two meters of sediment would have to be removed by wave action, which may be possible. However, the wave force that suspended and removed the sediment above the anchor would also disturb the sediments around and beneath the anchor, which would most likely allow downward migration of the anchor through the disturbed sediments rather than horizontal movement. Due to the density of the anchors compared to the

density of Louisiana's sediments, the anchors are expected to settle within the sediment and present very minimal physical risk to commercial or recreational fishing activities. An anchor test conducted found that within ten days, the test anchors settled to a depth of 1.9 to 2.1 meters at the test site. The anchor test may not be representative of sediment conditions across the entire area of concern. Anchors may have minimal penetration into sand sediments and have a nominal possibility to be moved or exposed during weather events, but would still be expected to present minimal risk to commercial and recreational vessels due to its location on or within the substrate.

d. Are there hazard to navigation concerns?

The Orphan Anchor Survey verified anchors in St. Bernards are deeply buried in soft deltaic sediments. These anchors are unlikely to be re-exposed, dislodged and moved shoreward. Anchors are small, compact, heavy objects that have a small cross sectional area -- they are heavy for their size. If the same amount of steel as in an anchor were to be reformed into another shape, for example, into a barrel or box shape, it would weigh the same but have a much larger cross sectional area, which would make it subject to being moved by wave action if exposed on the seabed. Waves can move heavy objects with large cross-sectional area, for example a 55-gallon oil drum or a sunken boat hull; either could be dislodged and moved horizontally by wave action because they have a large cross section area exposed to wave energy. An anchor, because of its small cross sectional area, is much less likely to be dislodged and moved by wave action should it become uncovered during a storm. Because waves disturb the bottom by suspending sediment in the water column, an anchor is most likely to migrate further downward, vertically, in the sediments in which it is buried than be transported horizontally. For the anchor to become exposed, around two meters of sediment would have to be removed by wave action, which may be possible. However, the wave force that suspended and removed the sediment above the anchor would also disturb the sediments around and beneath the anchor, which would most likely allow downward migration of the anchor through the disturbed sediments rather than horizontal movement. Due to the density of the anchors compared to the density of Louisiana's sediments, the anchors are expected to settle within the sediment and present very minimal physical risk as a hazard to navigation. An anchor test conducted found that within ten days, the test anchors settled to a depth of 1.9 to 2.1 meters at the test site. The anchor test may not be representative of sediment conditions across the entire area of concern. Anchors may have minimal penetration into sand sediments and have a nominal possibility to be moved or exposed during weather events, but would still be expected to present minimal risk as a hazard to navigation due to its location on or within the substrate.

e. What does the Net Environmental Benefit Analysis (NEBA) justify?

See matrix and conclusion below.

Conclusion: Based on the NEBA results, the conclusion is that the response option that would derive the greatest net environmental benefit is that of allowing the anchors to remain in place to degrade via natural processes. The analysis utilized effect values from +2 to -2 and a weight scale from 1 to 5. Thus the maximum scoring range is between +10 to -10 for each response option. Natural processes scored a -0.46 and had the least negative score of the response options studied. The "least invasive methods" category ranked as the second best option with a score of

-4.70. Ranking third and as the most adverse response option consider was the "most invasive methods" category which scored -7.63.

Recommendation: Based upon this analysis, the NEBA team recommends to the FOSC that the response option of Natural Processes be pursued as the response endpoint for the Louisiana Orphan Anchors.

List of Appendixes:
Appendix (a) Bird Nesting Map - St. Bernard
Appendix (b) Bird Nesting Map - Jefferson
Appendix (c) Analysis Assumptions and Ranking Factors
Appendix (d) NEBA Matrix

List of References:

Net Environmental Benefits Analysis for Boom Anchor Removal, 18 March, 2011, Prepared for Capt. Hanzalik, FOSC and Tom Zimmer, BP IC by L. Bruce, A. Maki, B. Wood, M. Taylor, T. M. Garrett, J. Burns, J. Hokanson

Gulf Coast Incident Management Team draft 7_5 Orphan Anchor Phase II Program, Report to the Federal On-scene Commander, Submitted 7 June 2011

Deepwater Horizon 2011 Shoreline Cleanup Assessment Technique (SCAT) Plan for Alabama/Florida/ Mississippi, March 11, 2011

GCRO, GIS. "Gulf of Mexico Response Viewer."Flexviewer. BP, 03 Jun 2011. Dynamic Web Map. <http://gomflexviewer.bp.com>.

OSAT 2 (http://www.restorethegulf.gov/release/2011/03/01/osat-2-fate-and-effects-oil-beaches) Contains analytical, ecological, and environmental fate data.

Pfister, C.,B.A. Harrington, and M. Lavine. 1992. The impact of human disturbance on shorebirds at a migration staging area. Biol. Conserv. 60: 115-126.

USFWS Current Nesting Sites, May 31, 2011

Gulf Coast Incident Management Team Shoreline Treatment Recommendations (STRs)

NIH website: http://ods.od.nih.gov/factsheets/iron/

NIH website: http://ods.od.nih.gov/factsheets/Zinc-HealthProfessional/#h2

Current Nesting Sites

for Area: St. Bernard Nesting Bird Use 10June11

Fri Jun 10 2011 10:52:30 AM

Disclaimer:
The map is only for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes and does not represent an on-the-ground survey and only represents the approximate relative location of management boundaries

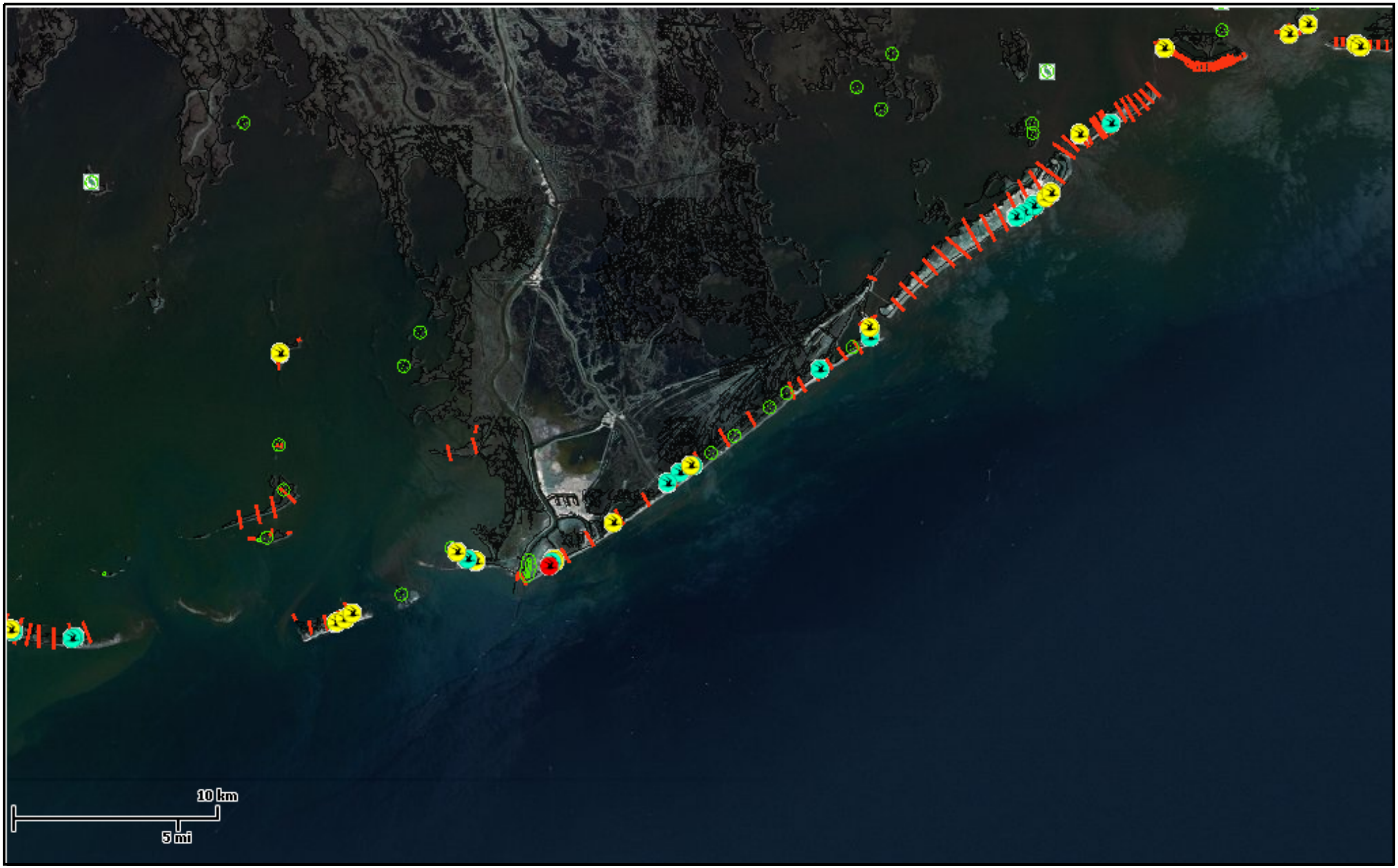
Nesting Status
- Destroyed/Abandoned
- Fledged
- Chicks
- Incubating
- Potential for New Nest

Nesting Buffer

LDWF Rookeries

Historic Sites

Operational Beach Zones



Current Nesting Sites

for Area: Jefferson Nesting 10June11

Fri Jun 10 2011 11:09:26 AM

Disclaimer:
The map is only for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes and does not represent an on-the-ground survey and only represents the approximate relative location of management boundaries

Nesting Status
- Destroyed/Abandoned
- Fledged
- Chicks
- Incubating
- Potential for New Nest

Nesting Buffer

LDWF Rookeries

Historic Sites

Operational Beach Zones

Appendix (c): Analysis Assumptions and Ranking Factors

Analysis Assumptions:

1. Best Management Practices will be implemented to the maximum extent practicable.
2. Any anchors present may or may not contain attached polypropylene line.
3. Any anchors present are expected to settle within soft, muddy sediments but may be partially or fully exposed on sand sediments.
4. That the State of Louisiana considers the orphan anchors to be waste if left in place.

Weights:

Higher weight values were assigned to those factors for which the federal government has regulatory obligations.

Ranking Factors:

Disturbance

-Gulf Sturgeon – Least disturbance will occur from no activities, while large equipment would create the greatest disturbance.

-Sea Turtles - Least disturbance will occur from no activities, while large equipment would create the greatest disturbance.

-Essential Fish Habitat Vegetated - Allowing natural processes to degrade the anchors over time below the sediment surface are anticipated to have no identifiable or measurable adverse affects on the quality and quantity of essential fish habitats. Any methods utilized, either least invasive or most invasive, to recover the anchors would result in turbidity and sediment removal in the immediate project area. Depending upon the utilization and effectiveness of water quality and turbidity control measures suspended sediments may adversely affect submerged aquatic vegetation and oysters beyond the immediate project area. Over time, unvegetated bottoms are expected to recover more quickly than vegetated bottoms or areas supporting oysters. Factoring longer recovery time, as well as potential permanent loss of these habitat types in the immediate project area, is cause for greater concern in these habitat types. No identifiable or measurable adverse impacts to essential fish habitats are anticipated to occur from exposure to zinc or iron if the anchors are allowed to degrade over time below the sediment surface.

-Essential Fish Habitat Non-Vegetated – See Essential Fish Habitat Vegetated description.

-Migratory Birds - Leaving the anchors in place (natural processes) would result in no disturbance effect to migratory birds because retrieval actions would not occur (causing disturbance) and known anchors are buried in sediments of the sea floor. Larger boats and crews operating over greater periods of time would more likely create disturbance to migratory birds nesting in the vicinity of actions (please refer to migratory bird nesting maps).

-Marine Mammals - Least disturbance will occur from no activities, while large equipment would create the greatest disturbance.

-Other Wildlife - Least disturbance will occur from no activities, while large equipment would create the greatest disturbance.

-Physical habitat - Least disturbance will occur from no activities, while large equipment would create the greatest disturbance.

-Historic Property – Section 106 Concerns. There are no recorded cultural resources Division 4 or Division 5. There are two unidentified objects reported in Division 2. Consequently, the probability of cultural resources in the survey areas in the Orphan Anchor Survey appears low; the primary concern is inadvertent discovery and potential disturbance to historic properties. The recovery methods can be ranked in order as to how much each will disturb the sea bed. This ranking would be the same for Section 106 concerns, which are directly related to bottom disturbance. The most desirable option in terms of potential adverse effects on submerged historical properties is to leave the anchors in place. However, in terms of Section 106 concerns, leaving them in place does not constitute "no adverse effect." There is an adverse effect in leaving them because they constitute intrusive magnetic "noise" into state submerged lands. Historic property survey on submerged lands relies on magnetometer survey to locate ferrous objects of cultural origin but of unknown significance. In order to evaluate the historical significance of an object, it must be evaluated by a trained underwater archaeologist. Objects cannot be reliably identified and evaluated solely on their magnetic signature. Should the Trustee decide in the future to conduct a systematic archaeological survey of the submerged area in which the anchors remain, the anchors would be located and have to be evaluated in situ for their significance like all other magnetic anomalies in the survey area. In the case of the anchors, for which a specific and reliable magnetic signature has been developed, the Trustee's extra effort that would be expended in examining these anchors is offset by knowing where they are so they do not have to be examined in a future survey. Transfer of the comprehensive survey data set collected during the Orphan Anchor Survey to the Trustee mitigates the adverse effect from leaving them in place in terms of Section 106.

Exposure to Zinc and Iron

-Gulf Sturgeon – The chemical composition and degradation of the metal anchors are expected to be insignificant due to the natural concentrations of zinc and iron present in the marine environment and the expected small loading rate and area of impact.

-Sea Turtles - The chemical composition and degradation of the metal anchors are expected to be insignificant due to the natural concentrations of zinc and iron present in the marine environment and the expected small loading rate and area of impact.

-Essential Fish Habitat Vegetated - Allowing natural processes to degrade the anchors over time below the sediment surface are anticipated to have no identifiable or measurable adverse affects on the quality and quantity of essential fish habitats. Any methods utilized, either least invasive or most invasive, to recover the anchors would result in turbidity and sediment removal in the immediate project area. Depending upon the utilization and effectiveness of water quality and turbidity control measures suspended sediments may adversely affect submerged aquatic vegetation and oysters beyond the immediate project area. Over time, unvegetated bottoms are expected to

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-Essential Fish Habitat Non-Vegetated - See Essential Fish Habitat Vegetated description.

-Migratory Birds - Because the anchors are submerged, there would be no exposure of migratory birds to zinc or iron.

-Marine Mammals - The chemical composition and degradation of the metal anchors are expected to be insignificant due to the natural concentrations of zinc and iron present in the marine environment and the expected small loading rate and area of impact.

-Other Wildlife - The chemical composition and degradation of the metal anchors are expected to be insignificant due to the natural concentrations of zinc and iron present in the marine environment and the expected small loading rate and area of impact.

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the Trustee mitigates the adverse effect from leaving them in place in terms of Section 106.

Waste Generation – Expected waste to be generated during the response process. May include the product being removed, incidental material collected due to recovery efficiencies (sand, seaweed, etc.), disposable or soiled responder protective equipment, consumables & packaging material, etc.

Human Health – Expected impacts to human health from the available response options. Normally due to the presence or reduction of potentially hazardous materials related to each response option.

Safety: Industrial – Safety considerations for the response personnel conducting the specific response option. Unless mitigated, highly hazardous response options are unlikely to be considered due to the potential for personnel injury.

Safety: Public - Safety considerations for the general public which may access the area under consideration and thus be exposed to specific hazards.

Orphan Anchor NEBA

SCORING VALUES:	
+2	Most beneficial
+1	Beneficial
0	No Effect
-1	Adverse
-2	Most Adverse

Factors Affected	Stressor	Resource Name	weight	Response Options: Natural Processes	Least invasive methods	Most invasive methods	weighted scores		
Trust Resources	Disturbance	Gulf Sturgeon	5	0	-1	-2	0	-5	-10
		Sea Turtles	5	0	-1	-2	0	-5	-10
		Essential Fish Habitat - unvegetated	3	0	-1	-1	0	-3	-3
		Essential Fish Habitat - vegetated & oysters	4	0	-2	-2	0	-8	-8
		Marine Mammals	5	0	-1	-2	0	-5	-10
		Migratory birds	5	0	-1	-2	0	-5	-10
		Other wildlife	4	0	-1	-2	0	-4	-8
		Physical Habitat	4	0	-1	-2	0	-4	-8
		Historic Property	5	-1	-2	-2	-5	-10	-10
	Exposure to Zinc and Iron	Gulf Sturgeon	3	0	0	0	0	0	0
		Sea Turtles	3	0	0	0	0	0	0
		Essential Fish Habitat - unvegetated	3	0	0	0	0	0	0
		Essential Fish Habitat - vegetated & oysters	3	0	0	0	0	0	0
		Marine Mammals	3	0	0	0	0	0	0
		Migratory birds	3	0	0	0	0	0	0
		Other wildlife	2	0	0	0	0	0	0
		Physical Habitat	1	0	0	0	0	0	0
		Historic Property	1	0	0	0	0	0	0

Trust Resources (AVG)	5	-0.278	-2.722	-4.278	-1.3889	-13.611	-21.39
Waste Generation	1	0	-0.5	-1.5	0	-0.5	-1.5
Human Health	5	0	0	0	0	0	0
TOTAL SCORE (AVG)		**-0.463**	**-4.704**	**-7.630**			

Safety - Industrial	5	0	-2	-2	0	-10	-10
Safety - Public	5	-2	0	0	-10	0	0
SAFETY TOTAL		**-5**	**-5**	**-5**			

Completed June 09, 2011